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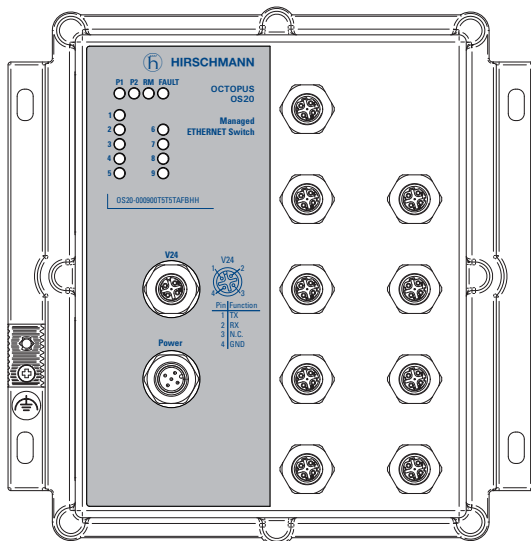
A **BELDEN** BRAND

User Manual

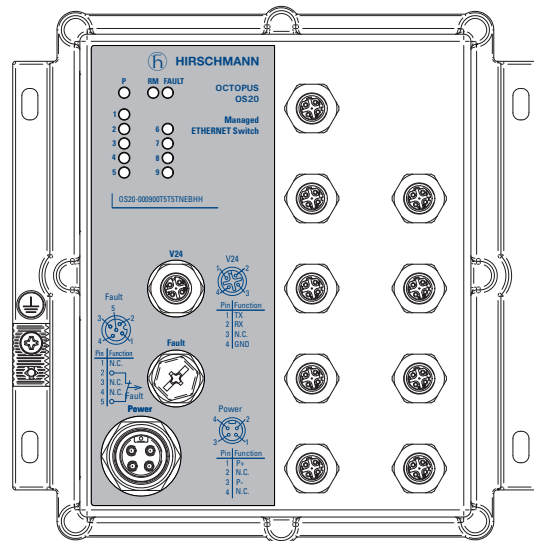
Installation

Managed IP67 Switch

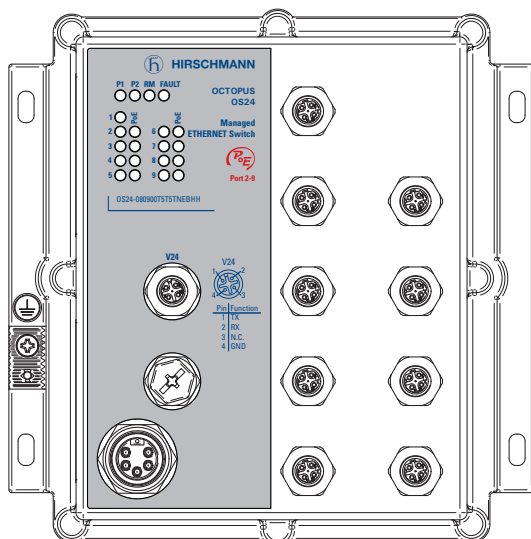
OCTOPUS OS20/OS24 Managed



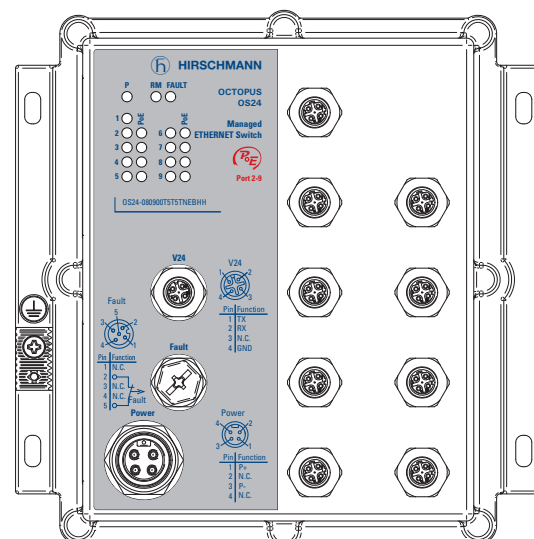
OS20-000900T5T5TAFBHH



OS20-000900T5T5TNEBHH



OS24-080900T5T5TFFBHH



OS24-080900T5T5TNEBHH



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You can get the latest version of this manual on the Internet at the Hirschmann product site (www.hirschmann.com).

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Safety instructions

■ Important Information

Notice: Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.



DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

Note: A note contains important information on the product, on how to manage the product, or on the respective section of the documentation to which your special attention is being drawn.

■ Certified usage

The device may only be employed for the purposes described in the catalog and technical description, and only in conjunction with external devices and components recommended or approved by the manufacturer. The product can only be operated correctly and safely if it is transported, stored, installed and assembled properly and correctly. Furthermore, it must be operated and serviced carefully.

Certification type (Product code position 18, see table 3 on page 13)	Operational environment
E	In the inside of buildings In the inside of trains
F	In the inside of buildings In the inside of trains In the inside of ships In the inside of vehicles

Table 1: Operational environment

■ Supply voltage

The supply voltage is electrically isolated from the housing.

- ☐ Use undamaged parts.
- ☐ Relevant for North America:
Only use copper wire/conductors of class 1, 75 °C.
- ☐ Exclusively connect SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1 to the signal contacts.
- ☐ Applies to devices with operating voltage type F:
Exclusively connect SELV circuits with the voltage restrictions in accordance with IEC/EN 60950-1 to the supply voltage connections.
- ☐ Applies to devices with operating voltage type A:
Ensure that the externally power unit connected upstream fulfills one of following conditions:
 - ▶ NEC Class 2
 - ▶ Limited Power Source based on EN 60950-1Relevant for North America: To be used in Class 2 circuits.

■ Shielding ground

Note: The shielding ground of the connectable twisted pair lines is connected to the housing as a conductor.

- ☐ Beware of possible short circuits when connecting a cable section with conductive shielding braiding.

■ Housing

Only technicians authorized by the manufacturer are permitted to open the housing.

The device is grounded via the separate ground screw.

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.



WARNING

RISK OF BURNING

The surfaces of the device housing may become hot. Avoid touching the device while it is operating. Wait until the device has cooled down.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

■ **Environment**

The device may only be operated at the specified surrounding air temperature (temperature of the surrounding air at a distance of up to 5 cm (1.97 in) from the device) and relative air humidity specified in the technical data.

- ☐ Install the device in a location where the climatic threshold values specified in the technical data are adhered to. Make sure the environment does not heat the device.
- ☐ Use the device only in an environment within the pollution degree specified in the technical data.

■ **Qualification requirements for personnel**

Qualified personnel as understood in this manual and the warning signs, are persons who are familiar with the setup, assembly, startup, and operation of this product and are appropriately qualified for their job. This includes, for example, those persons who have been:

- ▶ trained or directed or authorized to switch on and off, to ground and to label power circuits and devices or systems in accordance with current safety engineering standards;
- ▶ trained or directed in the care and use of appropriate safety equipment in accordance with the current standards of safety engineering;
- ▶ trained in providing first aid.

■ **General safety instructions**

Please note that products recommended as accessories may have characteristics that do not fully correspond to those of the corresponding product. This may limit their possible usage in the overall system. This device is operated by electricity. You must follow precisely the prescribed safety requirements for the voltage connections in this document.

See [“Supply voltage” on page 6](#).

Non-observance of these safety instructions can therefore cause material damage and/or injuries.

- ☐ Only appropriately qualified personnel should work on this device or in its vicinity. Qualified personnel must be thoroughly familiar with the warnings and maintenance procedures in accordance with this operating manual.
- ☐ The proper and safe operation of this device depends on proper handling during transport, proper storage and assembly, and conscientious operation and maintenance procedures.
- ☐ Never start operating the device with damaged components.
- ☐ Only use the devices in accordance with this manual. In particular, observe the warnings and safety-related information.
- ☐ Any work that may be required on the electrical installation may only be carried out by personnel trained for this purpose.

■ **National and international safety regulations**

- ☐ Make sure that the electrical installation meets local or nationally applicable safety regulations.

■ **E marking**

The labeled devices comply with the regulations contained in the following European directive(s):

Rule No. 10 of the Economic Commission for Europe (ECE): Devices with a certification are labelled with the E type-approval mark.
(Relevant for devices with certification type F)

■ **CE marking**

The labeled devices comply with the regulations contained in the following European directive(s):

2011/65/EU (RoHS)

Directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

2006/95/EC

Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electrical equipment to be used within specific voltage ranges.

2004/108/EC (EMC)

Directive of the European Parliament and the council for standardizing the regulations of member states with regard to electromagnetic compatibility.

In accordance with the above-named EU directive(s), the EU conformity declaration will be at the disposal of the relevant authorities at the following address:

Hirschmann Automation and Control GmbH
Stuttgarter Str. 45-51
72654 Neckartenzlingen
Germany
Tel.: +49 1805 141538

The product can be used in the industrial sector.

- ▶ Interference immunity: EN 61000-6-2:2005
- ▶ Emitted interference: EN 55022:2010

Warning! This is a class A device. This device can cause interference in living areas, and in this case the operator may be required to take appropriate measures.

Note: The assembly guidelines provided in these instructions must be strictly adhered to in order to observe the EMC threshold values.

■ **FCC note**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions : (1) This device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation.

Appropriate testing has established that this device fulfills the requirements of a class A digital device in line with part 15 of the FCC regulations.

These requirements are designed to provide sufficient protection against interference when the device is being used in a business environment. The device creates and uses high frequencies and can also radiate high frequencies, and if it is not installed and used in accordance with this operating manual, it can cause radio transmission interference. The use of this device in a living area can also cause interference, and in this case the user is obliged to cover the costs of removing the interference.

■ **Recycling note**

After usage, this product must be disposed of properly as electronic waste, in accordance with the current disposal regulations of your county, state and country.

About this Manual

The “Installation” user manual contains a device description, safety instructions, a description of the display, and the other information that you need to install the device.

The following manuals are available as PDF files on the CD-ROM supplied:

- ▶ Installation user manual
- ▶ Basic Configuration user manual
- ▶ Redundancy Configuration user manual
- ▶ Graphical User Interface reference manual
- ▶ Command Line Interface user manual

The Industrial HiVision Network Management Software provides you with additional options for smooth configuration and monitoring:

- ▶ Simultaneous configuration of multiple devices
- ▶ Graphic interface with network layout
- ▶ Auto-topology discovery
- ▶ Event log
- ▶ Event handling
- ▶ Client/server structure
- ▶ Browser interface
- ▶ ActiveX control for SCADA integration
- ▶ SNMP/OPC gateway.

Legend

The symbols used in this manual have the following meanings:

▶	Listing
□	Work step
■	Subheading

1 Device description

1.1 General device description

The OCTOPUS OS20/OS24 Managed devices are designed for the special requirements of industrial automation. They meet the relevant industry standards, provide very high operational reliability, even under extreme conditions, and also provide long-term reliability and flexibility.

The devices allow you to set up switched industrial Ethernet networks that conform to the IEEE 802.3 standard in line and ring structures.

The devices work without a fan.

The 9 twisted pair ports are M12 sockets.

The twisted pair ports support:

- ▶ Autocrossing
- ▶ Autonegotiation
- ▶ Autopolarity

Mount the device on a level surface with four M5 screws.

There are convenient options for managing the device. Administer your devices via:

- ▶ a Web browser
- ▶ management software (e.g. Industrial HiVision)
- ▶ a V.24 interface (locally on the device)

The redundancy concept allows the network to be reconfigured quickly.

The devices provide you with a large range of functions. Information pertaining to these functions is found in the relevant operating software manuals. These manuals are available as PDF files on the CD ROM provided, or you can download them from the Internet on the Hirschmann product pages (www.hirschmann.com).

The Hirschmann network components help you ensure continuous communication across all levels of the company network.

Connect your devices to:

- ▶ devices of the OCTOPUS family
- ▶ devices of the Open Rail family
- ▶ devices of the MICE family
- ▶ backbone devices of the MACH family
- ▶ the BAT wireless transmission system

- ▶ the EAGLE security system
- ▶ products for the LION control room / MACH 100 family

1.2 Description of the device variants

The [table 2](#) informs you about the possible device variants.

Device name and product code	Order number	Characteristics
OS20-000900T5T5TAFBHH	942 025-005	24 V
OS20-000900T5T5TNEBHH	942 025-006	110 V
OS24-080900T5T5TFFBHH	942 025-007	24 V, PoE
OS24-080900T5T5TNEBHH	942 025-008	110 V, PoE

Table 2: Device types: product code, order number

The device name corresponds to the product code. The product code is made up of variables with defined positions. The variable values stand for specific product characteristics ([see table 3](#)).

Item	Product characteristic	Product code	Value for the characteristic	
1 ... 4	Product	OS20	Octopus device	▶ with Fast Ethernet ports ▶ without PoE ports
		OS24	Octopus device	▶ with Fast Ethernet ports ▶ with PoE+ ports
5	(hyphen)	—		
6 ... 7	Number:	00	0 ×	PoE+ ports
	Special ports	08	8 ×	PoE+ ports
8 ... 9	Number: 100 Mbit/s ports	09	9 ×	100 Mbit/s ports (see on page 20)
10 ... 11	Number: 1000 Mbit/s ports	00	0 ×	1000 Mbit/s ports
12 ... 13	uplink port	T5	1 ×	100 Mbit/s ports Twisted pair M12
14 ... 15	uplink port	T5	1 ×	100 Mbit/s ports Twisted pair M12
16	Temperature range	T	Extended	−40 °F ... +158 °F (−40 °C ... +70 °C)

Table 3: Device name

Item	Product characteristic	Product code	Value for the characteristic
17	Operating voltage (see on page 20)	A	Rated voltage range DC 24 V ... 48 V
			 Observe the warning for railway standard EN 50155! (see on page 27)
			Voltage range DC incl. maximum tolerances 9,6 V ... 60 V
		F	Connection M12 type
			Rated voltage range DC 24 V ... 48 V
			 Observe the warning for railway standard EN 50155! (see on page 28)
			Voltage range DC incl. maximum tolerances 16,8 V ... 60 V
		N	Connection 7/8" connectors, 5-pin type
			Rated voltage range DC 72 V ... 110 V
			Voltage range DC incl. maximum tolerances 50,4 V ... 138 V
18	Certifications	E	► UL
			► Railway (along track)
			► Railway (train)
		F	► UL
			► Railway (along track)
			► Railway (train)
19	Software variant	B	Basic
20	Configuration	H	Hirschmann
21	Device model	H	IP67

Table 3: Device name

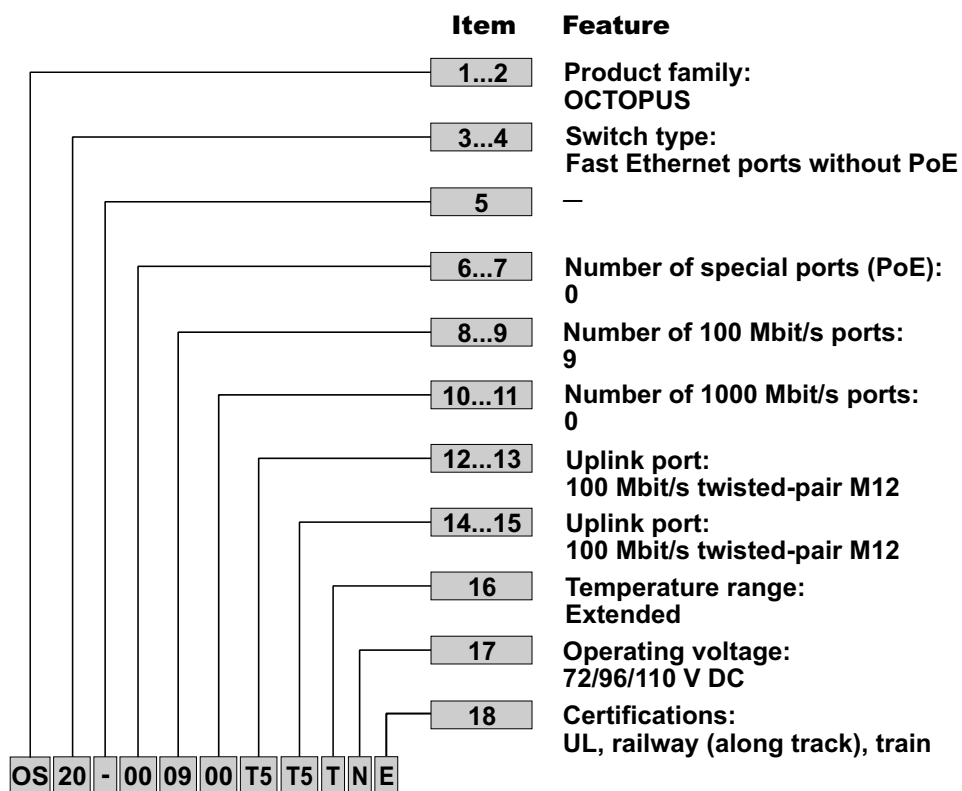
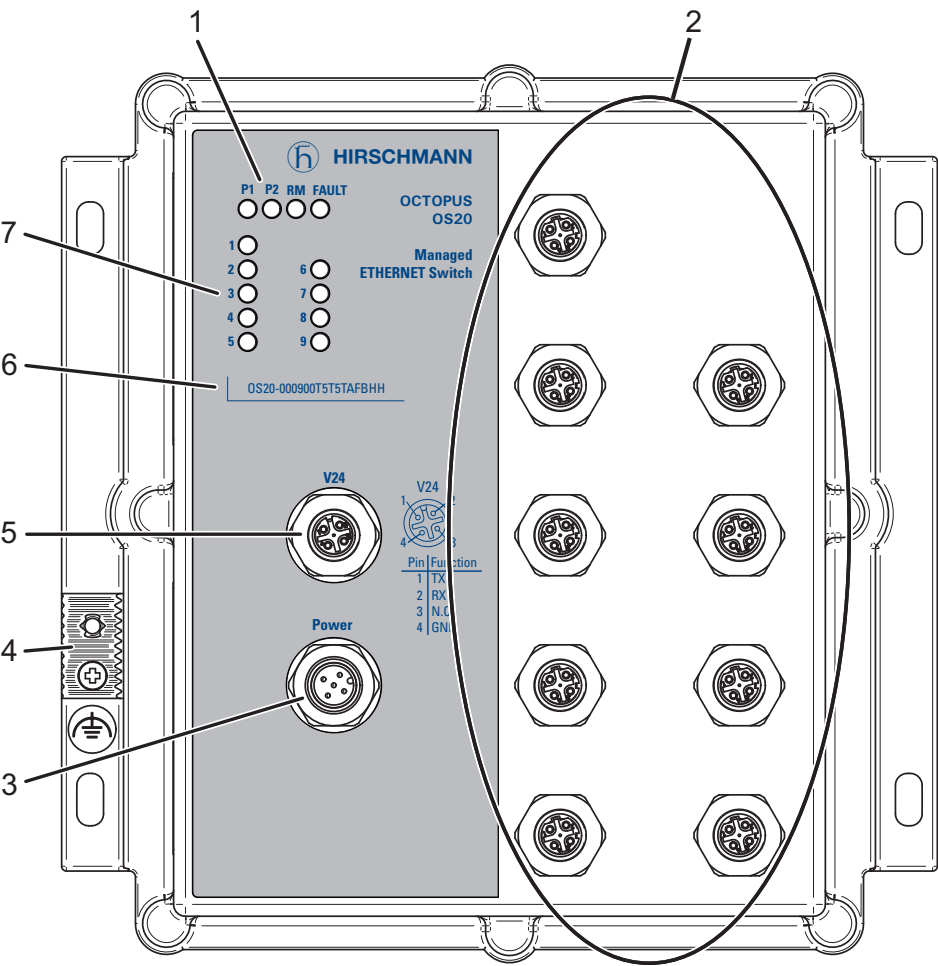


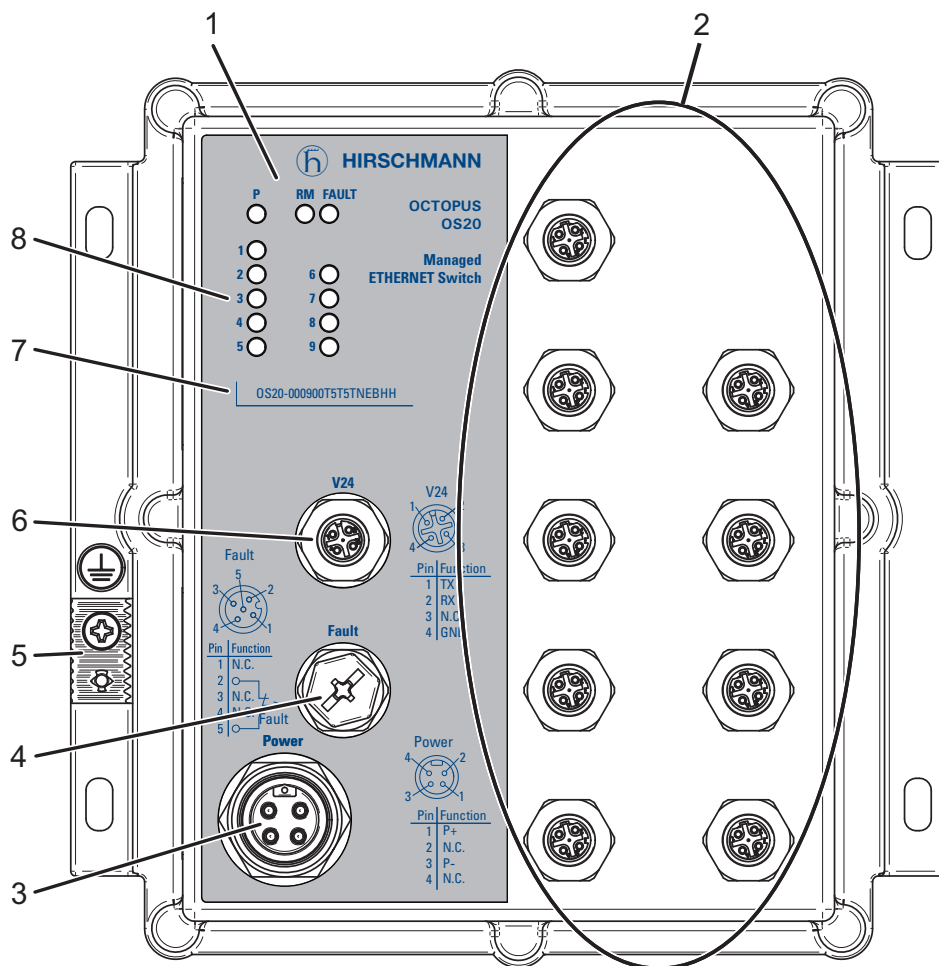
Figure 1: Example of a device name:
OS20-000900T5T5TNE...

1.3 Device view



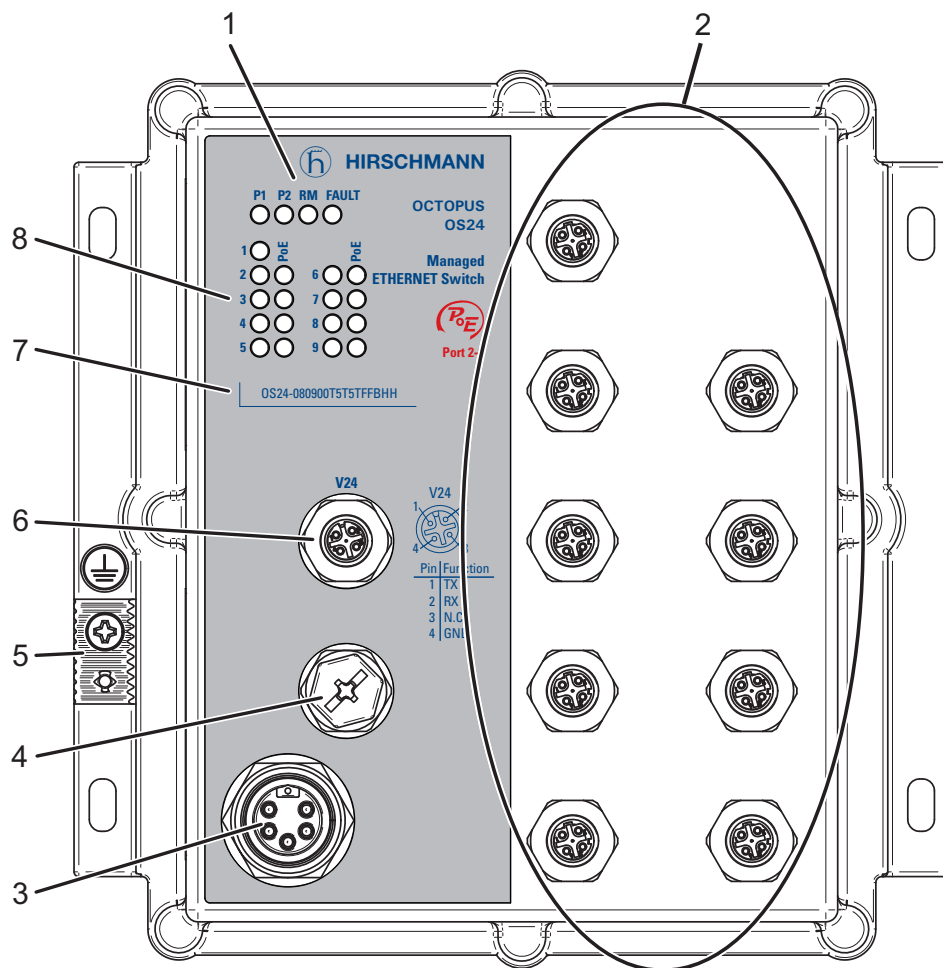
1	LED display elements (see on page 24)	Device Status	
		P1	Supply voltage 1
		P2	Supply voltage 2
		RM	Ring Manager
		FAULT	Signal contact
2	100 Mbit/s ports (see on page 20)		
3	Connecting the supply voltage (see on page 20)		
4	Grounding screw	M3	
5	V.24 connection for external management (see on page 23)		
6	Product code (see table 3)		
7	LED display elements (see on page 25)	port state	

Table 4: Overview: Display elements and interfaces of device OS20–000900T5T5TAFBHH



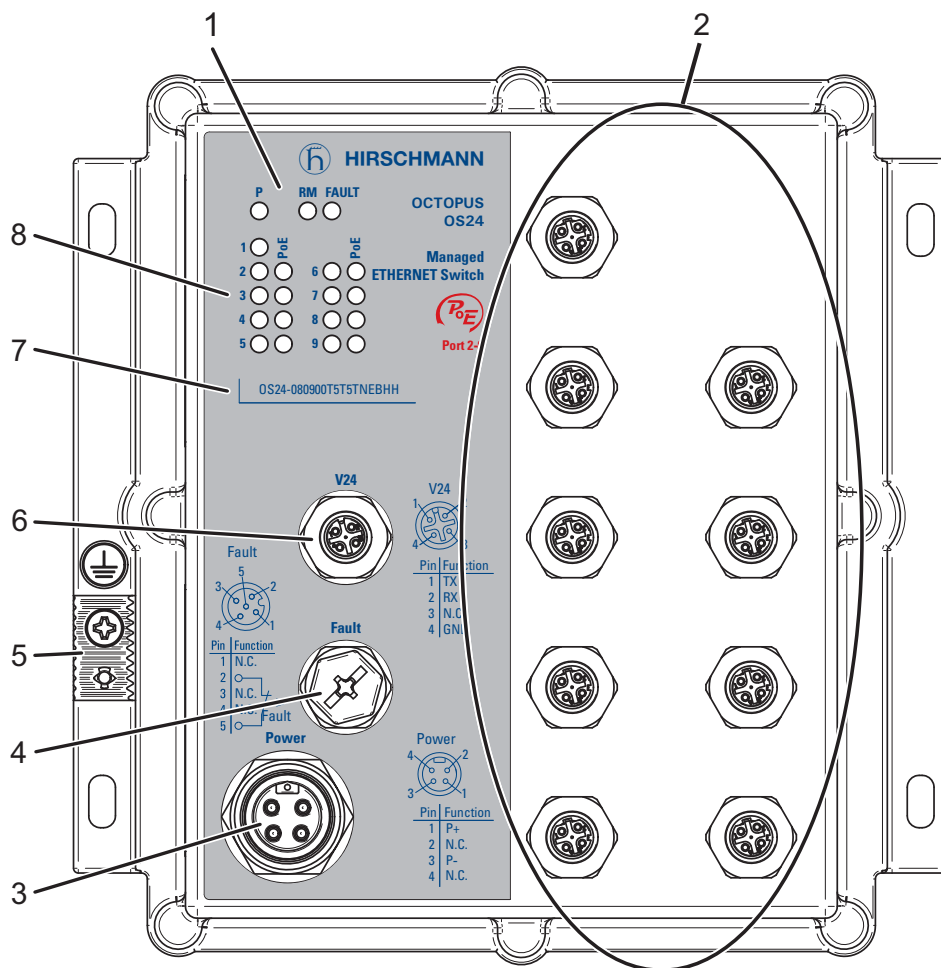
1	LED display elements (see on page 24)	Device Status	
		P	Power supply
		RM	Ring Manager
		FAULT	Signal contact
2	100 Mbit/s ports (see on page 20)		
3	Connecting the supply voltage (see on page 20)		
4	Connection for the signal contact (see on page 22)		
5	Grounding screw	M4	
6	V.24 connection for external management (see on page 23)		
7	Product code (see table 3)		
8	LED display elements (see on page 25)	port state	

Table 5: Overview: Display elements and interfaces of device
OS20-000900T5T5TNEBHH



1	LED display elements (see on page 24)	Device Status	
		P1	Supply voltage 1
		P2	Supply voltage 2
		RM	Ring Manager
		FAULT	Signal contact
2	Port 1	100 Mbit/s ports (see on page 20)	
	Ports 2,3,4,5,7,8,9	100 Mbit/s PoE+ ports (see on page 21)	
3	Connecting the supply voltage (see on page 20)		
4	Connection for the signal contact (see on page 22)		
5	Grounding screw	M4	
6	V.24 connection for external management (see on page 23)		
7	Product code (see table 3)		
8	LED display elements (see on page 25)	port state	

Table 6: Overview: Display elements and interfaces of device
OS24-080900T5T5TFFBHH



1	LED display elements (see on page 24)	Device Status
		P Power supply
		RM Ring Manager
		FAULT Signal contact
2	Port 1	100 Mbit/s ports (see on page 20)
	Ports 2,3,4,5,7,8,9	100 Mbit/s PoE+ ports (see on page 21)
3	Connecting the supply voltage (see on page 20)	
4	Connection for the signal contact (see on page 22)	
5	Grounding screw	M4
6	V.24 connection for external management (see on page 23)	
7	Product code (see table 3)	
8	LED display elements (see on page 25)	port state

**Table 7: Overview: Display elements and interfaces of device
OS24-080900T5T5TNEBHH**

1.4 Power supply

1.4.1 Operating voltage type A

A 5-pin M12 connector is available to supply the device without PoE redundantly.

You will find more information on [page 27](#).

1.4.2 Operating voltage type F

A 5-pin 7/8" connector is available to supply the device with PoE redundantly.

You will find more information on [page 28](#).

1.4.3 Operating voltage type N

A 4-pin 7/8" connector is available to supply the device.

You will find more information on [page 29](#).

1.5 Interfaces

1.5.1 10/100 Mbit/s twisted pair connection (4-pin M12 connector)

10/100 Mbit/s ports enable the connection of terminal devices or independent network segments according to the IEEE 802.3 100BASE-TX / 10BASE-T standard.

These ports support:

- ▶ Autonegotiation
- ▶ Autopolarity
- ▶ Autocrossing (if autonegotiation is activated)
- ▶ 100 Mbit/s half-duplex mode, 100 Mbit/s full duplex mode
- ▶ 10 Mbit/s half-duplex mode, 10 Mbit/s full duplex mode

Delivery state: autonegotiation activated

The socket housing is electrically connected to the housing.

Note: Some of these ports also support Power over Ethernet (PoE). For more information see [page 21 “10/100 Mbit/s twisted pair connection for PoE \(4-pin M12 sockets\)”](#).

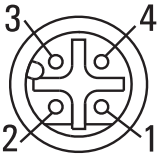
Figure	Pin	Function
	1	TD+ Transmit Data +
	2	RD+ Receive Data +
	3	TD- Transmit Data -
	4	RD- Receive Data -
	Housing: shield	

Table 8: Pin assignment of a TP/TX interface (M12 socket)

The patch cables for operating the device are shown in [table 9](#).

Patch cables	Wire pairs
M12 4-pin on M12 4-pin, crossed (MDI to MDI)	1 (TX+) – 2 (RX+) 2 (RX+) – 1 (TX+) 3 (TX-) – 4 (RX-) 4 (RX-) – 3 (TX-)
M12 4-pin on M12 4-pin, 1:1 (MDI to MDI-X via auto-crossing port)	1 (TX+) – 1 (RX+) 2 (RX+) – 2 (TX+) 3 (TX-) – 3 (RX-) 4 (RX-) – 4 (TX-)
M12 4-pin on RJ45, crossed (MDI to MDI (terminal device))	1 (TX+) – 3 (RX+) 2 (RX+) – 1 (TX+) 3 (TX-) – 6 (RX-) 4 (RX-) – 2 (TX-)
M12 4-pin on RJ45, 1:1 (MDI to MDI-X (Switch))	1 (TX+) – 1 (RX+) 2 (RX+) – 3 (TX+) 3 (TX-) – 2 (RX-) 4 (RX-) – 6 (TX-)

Table 9: Patch cables for operating the device

1.5.2 10/100 Mbit/s twisted pair connection for PoE (4-pin M12 sockets)

Some device variants support Power over Ethernet based on IEEE 802.3at (PoE+) via a twisted pair:

Device	Number of TX ports	PoE-capable TX ports included
OS20-...	9	None
OS24-...	9	8 (Port 2 ... 9)

Table 10: Device types: Twisted-pair ports and PoE support

The PoE ports allow the connection and remote supply of, for example, IP telephones (Voice over IP), webcams, sensors, printer servers and WLAN access points. With PoE, power is supplied to these terminal devices via the twisted-pair cable.

The devices are supplied with PoE voltage (53 V DC safety low voltage) via the internal voltage supply. The PoE voltage to the twisted-pair cables is supplied via the wire pairs transmitting the signal (phantom voltage).

The total PoE power output is limited to 61.6 W.

You can use the device management to configure and manage the total output of the device.

You will find more information relating to this in the “Basic Configuration User Manual” on the CD-ROM.

1.5.3 “FAULT” signal contact

- ▶ The signal contact (“FAULT”, for pin assignment see [table 8](#)) is used for the remote monitoring of the device to enable remote diagnostics. You can specify the type of function monitoring in the Management.
- ▶ You can also use the Management to set the signal contact manually and thus control external devices.

A break in contact is used to report the following conditions via the potential-free signal contact (relay contact, closed circuit):

- ▶ The failure of at least one supply voltage.
- ▶ The device is not operational.
- ▶ The loss of connection at at least one port. The report of the link status can be masked by the Management for each port. In the delivery state, link status monitoring is deactivated.
- ▶ A detected error during the self-test.
- ▶ Incorrect configuration of the HIPER ring.

The following condition is also reported in RM mode:

- ▶ Ring redundancy reserve is available. On delivery, there is no ring redundancy monitoring.

Applies to devices with operating voltage type A:

Along with the supply voltage, the signal contact is connected via a 5-pin M12 connector.

[See “Devices with operating voltage type A” on page 27.](#)

Applies to devices with operating voltage types F and N:

The signal contact is connected via a 5-pin M12 connector.

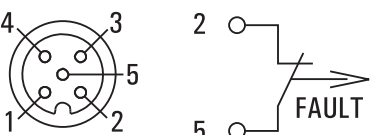
Figure	Pin	Operation
	1	Not used
	2	Fault
	3	Not used
	4	Not used
	5	Fault

Table 11: Pin assignment of the 5-pin M12 socket for connecting the signal contact

1.5.4 V.24 interface (external management)

The V.24 interface is an M12 socket.

The V.24 interface is a serial interface which allows you to connect the following devices locally:

- ▶ An external management station (VT100 terminal or PC with appropriate terminal emulation). This enables you to set up a connection to the Command Line Interface (CLI) and to the system monitor.
- ▶ An AutoConfiguration Adapter ACA 11

VT 100 terminal settings

Speed	9,600 Baud
Data	8 bit
Stopbit	1 bit
Handshake	off
Parity	none

The socket housing is electrically connected to the housing of the device.

Applies to devices with operating voltage type A:

The V.24 interface is not electrically isolated from the supply voltage.

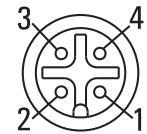
Figure	Pin	Function
	1	TX. Transmit Data
	2	RX Receive Data
	3	N.C. Not used
	4	GND Ground

Table 12: Pin assignment of the V.24 interface (M12 socket)

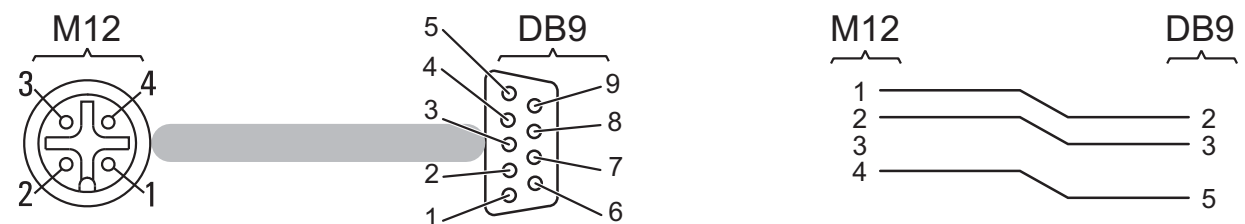


Figure 2: Pin assignment of the V.24 interface and the DB9 connector

Note: You will find the order number for the terminal cable, which is supplied separately, in the Technical Data chapter ([see page 42 “Accessories”](#)).

You will find a description of the V.24 interface in the “Basic Configuration User Manual” on the CD-ROM.

1.6 Display elements

Note: The [table 4](#) on [page 16](#) informs you about the positions of the display elements.

After the operating voltage is set up, the device starts and initializes the software. Afterwards, the device performs a self-test. During this process, various LEDs light up. The process takes around 30 seconds.

■ Device state

These LEDs provide information about conditions which affect the operation of the whole device.

LED	Display	Color	Activity	Meaning
P P1	Supply voltage 1	Green	Lights up	The supply voltage is on.
			None	The supply voltage is too low.
P2	Supply voltage 2	Green	Lights up	The supply voltage is on.
			None	The supply voltage is too low.
FAULT	Signal contact	Red	None	Signal contact is closed, it is not reporting a detected error.
			Lights up	The signal contact is open, it is reporting an error.
RM	Ring Manager	—	None	The RM function is deactivated.
		Green	Lights up	The RM function is active. The redundant port is disabled.
			flashing	Incorrect configuration of the HIPER-Ring (e.g. the ring is not connected to the ring port).
		Yellow	Lights up	The RM function is active. The redundant port is enabled.

If the manual adjustment is active on the “FAULT” signal contact, then the detected error display is independent of the setting of the signal contact.

■ Port state

These LED's display port-related information. During the boot phase, these LED's are used to display the status of the boot procedure.

LED	Display	Color	Activity	Meaning
1 ... 9	Link status	—	None	No valid connection
		Green	Lights up	Valid connection
			Flashes 1 time a period	Port is switched to stand by
			Flashes 3 times a period	Port is disabled
		Yellow	Flashing	Data traffic
PoE	PoE status	Green	None	No powered device connected
			Lights up	Powered device is supplied with power
			Flashes 1 time a period	No power supply to the powered device, as the total PoE output of the device has been exceeded
			Flashes 3 times a period	No power supply to the powered device, as PoE is deactivated in the device management

2 Device installation

The devices have been developed for practical application in a harsh industrial environment.

On delivery, the device is ready for operation.

The following procedure has been proven to be successful for the assembly of the device:

- ▶ [Unpacking and checking](#)
- ▶ [Connecting the connector for supply voltage and signal contact](#)
- ▶ [Installing the device and grounding](#)
- ▶ [Connecting the ferrite \(only devices with operating voltage type F\)](#)
- ▶ [Connecting the supply voltage, starting up](#)
- ▶ [Connecting the data lines](#)

2.1 Unpacking and checking

- ☐ Check that the contents of the package are complete ([see page 41 "Scope of delivery"](#)).
- ☐ Check the individual parts for transport damage.

2.2 Connecting the connector for supply voltage and signal contact

Note: Only connect the device to a power supply that complies to surge voltage category II or lower.

2.2.1 Devices with operating voltage type A



WARNING

ELECTRIC SHOCK

The nominal voltage of 48 V specified for trains can temporarily exceed the SELV threshold of 60 V based on EN 50155 para. 5.1.1.1. Use additional measures to limit the surge voltage to 60 V or use a lower nominal voltage.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For the supply voltage, the following applies:

- ▶ Operating voltage
 - ▶ Rated voltage range DC
24 V ... 48 V
 - ▶ Voltage range DC incl. maximum tolerances
9,6 V ... 60 V
- ▶ The input voltage is electrically isolated from the housing.
- ▶ The device provides for voltage supply redundancy with no load distribution.
- ▶ The supply voltage and the signal contact are connected by means of a 5-pin M12 connector (A coding, e.g. ELWIK A 5012 PG7 from Hirschmann, included in the delivery).

Note: The permitted cable diameter for connector ELWIK A 5012 PG7 is 4 mm to 6 mm. To ensure the watertightness of the OCTOPUS OS20/OS24 Managed device, only use voltage supply cables with a diameter within the specified range.

Figure	Pin	Function
	1	+ 24 ... 48 V DC (1)
	2	FAULT
	3	0 V
	4	+ 24 ... 48 V DC (2)
	5	FAULT

Table 13: Pin assignment of the 5-pin M12 socket for connecting the supply voltage and the signal contact

- ☐ Connecting the supply voltage and signal lines.

2.2.2 Devices with operating voltage type F



WARNING

ELECTRIC SHOCK

The nominal voltage of 48 V specified for trains can temporarily exceed the SELV threshold of 60 V based on EN 50155 para. 5.1.1.1. Use additional measures to limit the surge voltage to 60 V or use a lower nominal voltage.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For the supply voltage, the following applies:

- ▶ Operating voltage
 - ▶ Rated voltage range DC
24 V ... 48 V
 - ▶ Voltage range DC incl. maximum tolerances
16,8 V ... 60 V
- ▶ The input voltage is electrically isolated from the housing.
- ▶ The device provides for voltage supply redundancy with no load distribution.
- ▶ The supply voltage is connected via a 5-pin 7/8" connector.
[See "Accessories" on page 42.](#)

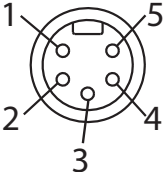
Figure	Pin	Function
	1	+ 24 ... 48 V DC (1)
	2	0 V (1)
	3	Not used
	4	0 V (2)
	5	+ 24 ... 48 V DC (2)

Table 14: Pin assignment of the 5-pin 7/8" connector for connecting the supply voltage

- ▶ The signal contact is connected via a 5-pin M12 connector (A coding, e.g. ELWIK A 5012 PG7 from Hirschmann, available as accessory).
See “Pin assignment of the 5-pin M12 socket for connecting the signal contact” on page 22.

Note: The permitted cable diameter for connector ELWIK A 5012 PG7 is 4 mm to 6 mm. To ensure the watertightness of the OCTOPUS OS20/OS24 Managed device, only use voltage supply cables with a diameter within the specified range.

- ☐ Connecting the supply voltage and signal lines.

2.2.3 Devices with operating voltage type N

For the supply voltage, the following applies:

- ▶ Operating voltage
 - ▶ Rated voltage range DC
72 V ... 110 V
 - ▶ Voltage range DC incl. maximum tolerances
50,4 V ... 138 V
- ▶ The input voltage is electrically isolated from the housing.
- ▶ The supply voltage is connected via a 4-pin 7/8" connector.
See “Accessories” on page 42.

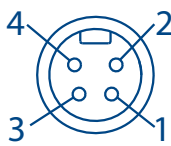
Figure	Pin	Function
	1	+ 72 ... 110 V DC
	2	Not used
	3	0 V
	4	Not used

Table 15: Pin assignment of the 4-pin 7/8" connector for connecting the supply voltage

- ☐ The signal contact is connected via a 5-pin M12 connector (A coding, e.g. ELWIK A 5012 PG7 from Hirschmann, available as accessory).
See “Pin assignment of the 5-pin M12 socket for connecting the signal contact” on page 22.

Note: The permitted cable diameter for connector ELWIK A 5012 PG7 is 4 mm to 6 mm. To ensure the watertightness of the OCTOPUS OS20/OS24 Managed device, only use voltage supply cables with a diameter within the specified range.

- ☐ Connecting the supply voltage and signal lines.

2.3 Installing the device and grounding

2.3.1 Installing the device



WARNING

ELECTRIC SHOCK

Applies to devices with operating voltage type N:
Install the device in such a way that it is protected against mechanical forces.

Failure to follow these instructions can result in death, serious injury, or equipment damage.



WARNING

RISK OF BURNING

Applies to devices with operating voltage type N:
Only install the device in “operating sites with restricted access” based on EN 60950-1.

Applies to devices with operating voltage types A and F:
Only install the device at ambient temperatures greater than 45°C in “operating sites with restricted access” based on EN 60950-1.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Note: To protect the exposed contacts of the components still to be installed from dirt, connect the individual system components in a dry and clean working area. Seal unused ports with the protection caps available as accessories.

- ☐ Install the device in a location where the climatic threshold values specified in the technical data are adhered to.
Make sure the environment does not heat the device.
- ☐ Applies to devices with operating voltage type F:
Take care that the temperature of the device base plate remains under 194 °F (90 °C) during operation.
You achieve this, for example, by means of one of the following measures:
 - ▶ You make sure that the operating voltage of the device is at least 20 V.
 - ▶ You limit the total PoE output to a maximum of 47 W.

- ▶ You limit the ambient temperature to a maximum of 149 °F (65 °C).
- ▶ You install the device on a 1.62 ft² (0.15 m²) metal plate to which you will connect no other heat sources.
- ☐ Prepare the drill holes at the installation point.
- ☐ Mount the device on a level surface with four M5 screws.

2.3.2 Grounding the device

The device is grounded via the separate ground screw.

[See “Device view” on page 16.](#)

Note: For the ground conductor, use a cable with a cross section of at least 2.5 mm² (North America: AWG12).

- ☐ Applies to devices with operating voltage type A:
Use the M3 screw for the function ground.
- Applies to devices with operating voltage types F and N:
Use the M4 screw for the protective ground.
- ☐ Use toothed washers to ensure good electrical conductivity at the connection.

Note: The shielding ground of the connectable twisted pair lines is connected to the housing as a conductor.

2.4 Connecting the ferrite (only devices with operating voltage type F)

To adhere to EMC conformity, you connect the ferrite supplied to the voltage input via the voltage supply line.

[See “Connecting the ferrite to the voltage supply line” on page 32.](#)

- ☐ Insert the voltage supply line through the ferrite 3 times.
- ☐ Position the ferrite as close as possible to the voltage output (max. distance 50 cm).
- ☐ Lock the ferrite.

Note: To open the ferrite use the key supplied.



Figure 3: Connecting the ferrite to the voltage supply line

2.5 Connecting the supply voltage, starting up



WARNING

ELECTRIC SHOCK

Ground the device before connecting the power supply.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

- ▶ Use a back-up fuse suitable for the supply network.
[See “General technical data” on page 37.](#)
- ▶ Do not use connectors as electrical isolating devices.
- ▶ Make sure that the disconnecting device is easily accessible for disconnecting the device from the mains voltage.
- ☐ Connect the power supply connector to the power supply socket of the device.

Note: The wire diameter for the input supply line is at least 1 mm² (North America: AWG16).

- ☐ When you connect the supply voltage, you start up the device.

2.6 Connecting the data lines

You can connect terminal devices and other segments at the ports of the device via twisted pair cables.

- ▶ Use a shielded CAT5 cable or better.
- ▶ Use a shielded 4-pin M12 plug.

Note: Only connect the PoE connections to PoE-supplier devices whose data connections are located in the interior of the building and are specified as SELV circuits.

Note: There is no galvanic separation between the PoE ports of an OCTOPUS OS24 device. If you are using these devices in ring structures, wire a PoE port with a non-PoE port to avoid a potential difference.

- ☐ Install the data lines according to your requirements.
- ☐ Connect the cable shield to the connector housing.

3 Basic set-up

The IP parameters must be entered when the device is installed for the first time. The device provides 6 options for configuring IP addresses:

- ▶ Entry via V.24 connection
- ▶ Entry using the HiDiscovery protocol via the application HiDiscovery or Industrial HiVision
- ▶ Configuration via BOOTP
- ▶ Configuration via DHCP
- ▶ Configuration via DHCP Option 82
- ▶ Auto Configuration Adapter



WARNING

UNINTENTIONAL OPERATION IN DEVICE

Install and maintain a process that assigns a unique IP address to every device in the network.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Further information on the basic settings of the device can be found in the “Basic Configuration” user manual on the CD ROM.

■ Default settings

- ▶ IP address: The device looks for the IP address using DHCP
- ▶ Password for management:
 - Login: user; password: public (read only)
 - Login: admin; password: private (read and write)
- ▶ Parameters that can be set via the management are set to pre-defined values in accordance with the MIB
- ▶ V.24 data rate: 9,600 Baud
- ▶ Ring redundancy: deactivated
- ▶ Ethernet ports: link status is not evaluated (signal contact)
- ▶ All ports: autonegotiation
- ▶ RM function (Ring Manager) not activated
- ▶ RSTP (Rapid Spanning Tree) activated
- ▶ HIPER-Ring not activated

■ **Monitoring the ambient temperature**

Only operate the device up to the specified maximum ambient air temperature.

The ambient air temperature is the temperature of the air at a distance of 5 cm from the device. It depends on the installation conditions, e.g. the distance from other devices or other objects, and the output of neighboring devices.

The device uses a temperature sensor on the printed circuit board (PCB) to determine the temperature displayed in the CLI and the GUI.

Therefore, the temperature value displayed in the CLI and the GUI differs from the ambient air temperature.

To determine the actual permitted maximum value for operating the device, you perform a reference measurement:

- ▶ Install the device at the planned location.
- ▶ Switch the device on and wait until it has reached its maximum operating temperature.
- ▶ Measure the ambient air temperature at a distance of 5 cm from the device.
- ▶ Read the temperature value displayed in the CLI or the GUI.
- ▶ Calculate the temperature difference.
- ▶ Add the difference to the maximum ambient air temperature specified in the manual.

This calculated value corresponds to the actual maximum permitted ambient air temperature, up to which you can operate the device.

4 Maintenance and service

- ☐ When designing this device, Hirschmann was largely able to forego using parts that are subject to wear and tear. The parts subject to wear are designed to last longer than the lifetime of the product when it is operated properly. Operate this device according to the specifications (see [“Technical data”](#)).
- ☐ Relays are subject to natural wear. This wear depends on the frequency of the switching operations. Check the resistance of the closed relay contacts and the switching function depending on the frequency of the switching operations.
- ☐ Hirschmann is continually working to improve and develop our software. You should regularly check whether there is a new version of the software that provides you with additional benefits. You will find software information and downloads on the product pages of the Hirschmann website.

Note: You will find information about the complaints and returns procedures in the Internet under

<http://www.beldensolutions.com/en/Service/Repairs/index.phtml>.

5 Technical data

■ General technical data

Dimensions W × H × D	See “Dimension drawings” on page 39.		
Weight	1,900 g		
Power supply Type A	Redundant power supply		
	Note: Ensure that the externally power unit connected upstream fulfills one of following conditions: ► NEC Class 2 ► Limited Power Source based on EN 60950-1		
	Rated voltage range DC	24 V ... 48 V	 Observe the warning for railway standard EN 50155! (see on page 27)
	Voltage range DC incl. maximum tolerances	9,6 V ... 60 V	
	Connection type	M12 connector, 5-pin	
	Power failure bypass	> 10 ms	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	2 A
		Characteristic:	slow blow
	Peak inrush current	14 A	
Power supply Type F	Redundant power supply		
	Rated voltage range DC	24 V ... 48 V	 Observe the warning for railway standard EN 50155! (see on page 28)
	Voltage range DC incl. maximum tolerances	16,8 V ... 60 V	
	Connection type	7/8" connectors, 5-pin	
	Power failure bypass	> 10 ms	
		No buffering of powered devices (PDs)	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	7 A
		Characteristic:	slow blow
	Peak inrush current	4.9 A	
Power supply Type N	Rated voltage range DC	72 V ... 110 V	
	Voltage range DC incl. maximum tolerances	50,4 V ... 138 V	
	Connection type	7/8" connectors, 4-pin	
	Power failure bypass	> 10 ms	
		No buffering of powered devices (PDs)	
	Overload current protection at input	Non-replaceable fuse	
	Back-up fuse	Nominal rating:	2.5 A
		Characteristic:	slow blow
	Peak inrush current	2.5 A	

Insulation voltage between operating voltage connections and housing		Operating voltage
		Type A 707 V DC
		Type F 707 V DC
		Type N 1414 V DC
“FAULT” signal contact	Switching current	max. 1 A, ohmic load
	Switching voltage	max. 48 V DC, SELV
Climatic conditions during operation	Surrounding air temperature	–40 °F ... +158 °F (–40 °C ... +70 °C) ^a
	Humidity	10% ... 95% (condensing)
	Air pressure	minimum 795 hPa (+2000 m) maximum 1060 hPa (–400 m)
Climatic conditions during storage	Surrounding air temperature	–40 °F ... +185 °F (–40 °C ... +85 °C)
	Humidity	10% ... 95% (condensing)
	Air pressure	minimum 700 hPa (+3000 m) maximum 1060 hPa (–400 m)
Degree of protection		IP67
Mounting	Flat surface mounting	
	Screw type	M5
Pollution degree		2

- a. Applies to devices with PoE only as long as the temperature of the device base plate remains under 194 °F (90 °C).

■ Dimension drawings

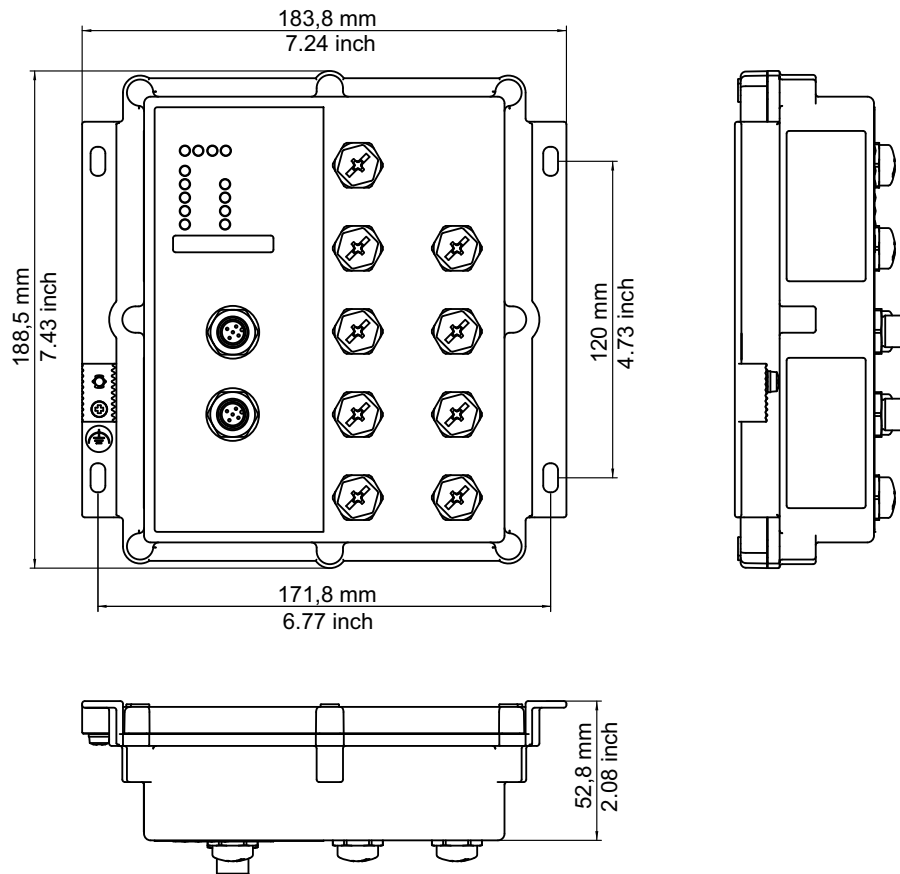


Figure 4: Dimensions

■ EMC and immunity

EMV interference immunity			
IEC/EN 61000-4-2	Electrostatic discharge		
	Contact discharge		6 kV
	Air discharge		8 kV
IEC/EN 61000-4-3	Electromagnetic field 80 MHz ... 2700 MHz		20 V/m
IEC/EN 61000-4-4	Fast transients (burst)		
	AC/DC supply connection		2 kV
	Data line		4 kV
IEC/EN 61000-4-5	Voltage surges		
	DC supply connection	line/line	1 kV
		line/ground	2 kV
	Data line		1 kV
IEC/EN 61000-4-6	Line-conducted interference voltages 150 kHz ... 80 MHz		10 V
EN 61000-4-9	Impulse-shaped magnetic fields		300 A/m
EMC emitted interference			
EN 55022	Class A		Yes
FCC 47 CFR Part 15	Class A		Yes
German Lloyd	Classification + Construction Guidelines VI-7-3 Part 1 Ed.2001		Yes
Stability			
Vibration	IEC 60068-2-6 Test FC test level according to IEC 61131-2	Yes	
	Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1	Yes	
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	Yes	
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes	
Shock	IEC 60068-2-27 Test Ea test level according to IEC 61131-2	Yes	
	IEC 870-2-2 table 3 normal installation according to EN 61850-3	Yes	
	EN 61373, Category 1, Class A (broadband noise), installation in acc. with EN 50155	Yes	

■ Network range

TP port	
Length of a twisted pair segment	max. 100 m/328 ft (for cat5e cable)

Table 16: TP port 10BASE-T / 100BASE-TX / 1000BASE-T

■ Power consumption/power output

Device name and product code	Maximum power consumption	Power output
OS20-000900T5T5TAFBHH	6.7 W	22.9 Btu (IT)/h
OS20-000900T5T5TNEBHH	12 W	41 Btu (IT)/h
OS24-080900T5T5TFFBHH	80 W	68 Btu (IT)/h
OS24-080900T5T5TNEBHH	80 W	68 Btu (IT)/h

■ Scope of delivery

Device name and product code	Scope of delivery
OS20-000900T5T5TAFBHH	Octopus device Connector ELWIK 5012 PG7 for supply voltage and signal contact Note: Connector ELWIK 5012 PG7 (933 175-100) supports a temperature range from -25°C to +70°C. Thus it can restrict the operation location for the overall system. You can obtain special connectors with protection class IP67 and an extended temperature range on request. Installation user manual and CD-ROM
OS24-080900T5T5TFFBHH	Octopus device Ferrite with key Installation user manual and CD-ROM
OS20-000900T5T5TNEBHH	Octopus device
OS24-080900T5T5TNEBHH	Installation user manual and CD-ROM

■ Order numbers/product description

Device name and product code	Order number
OS20-000900T5T5TAFBHH	942 025-005
OS20-000900T5T5TNEBHH	942 025-006
OS24-080900T5T5TFFBHH	942 025-007
OS24-080900T5T5TNEBHH	942 025-008

Table 17: Device types: product code, order number

■ Accessories

Note: Some products recommended as accessories do not support the entire temperature range specified for the device. They can thus restrict the possible range of usage for the overall system.

Note: Unsealed accessory parts are not suitable for use within an IP67 area.

The following accessory parts are unsealed:

- ▶ Transition M12 D-coded to RJ45
- ▶ Terminal cable

Name	Order number
Pocket Guide	280 710-851
Terminal cable	943 902-001
Connector ELWIK 5012 PG7 (5-pin M12 socket for supply voltage and signal contact)	933 175-100
AutoConfiguration Adapter ACA11-M12	943 972-001
Field-attachable 5-pin M12 socket, "A"-coded with 2 cable outputs	RKC5/Duo
M12 connector, 4-pin, D-coded	934 445-001
7/8" connectors, 4-pin	942 086-004
7/8" connectors, 5-pin	942 086-005
Connection cable with M12 connector, "D"-coded	934 497-00x
Transition M12 D-coded to RJ45	934 498-001
Industrial HiVision Network Management software	943 156-xxx
OPC server software HiOPC	943 055-001
OCTOPUS locking screw set (25 pcs.)	942 057-001

■ Underlying norms and standards

Name	
EN 50121-4	Railway applications - EMC - emitted interference and interference immunity for signal and telecommunication systems
EN 50155	Railway applications – electronic systems in railway vehicles
EN 55022	IT equipment – radio interference characteristics
EN 61000-6-2	Generic norm – immunity in industrial environments
EN 61131-2	Programmable logic controllers
FCC 47 CFR Part 15	Code of Federal Regulations
Germanischer Lloyd	Ship Applications - Classification and Construction Guidelines VI-7-3 Part 1 Ed.2003
RL 72/245/EWG, 2009/19/EG	E type certification for use in vehicles
DIN 5510-2, NF F 16-101, NF F 16-102	Fire protection in railway vehicles

Table 18: List of norms and standards

The device has a certification based on a specific standard only if the certification indicator appears on the housing.
However, with the exception of Germanischer Lloyd, ship certifications are only included in the product information under www.hirschmann.com.

A Further Support

■ Technical Questions

For technical questions, please contact any Hirschmann dealer in your area or Hirschmann directly.

You will find the addresses of our partners on the Internet at
<http://www.hirschmann.com>

Contact our support at
<https://hirschmann-support.belden.eu.com>

You can contact us

in the EMEA region at

- ▶ Tel.: +49 (0)1805 14-1538
- ▶ E-mail: hac.support@belden.com

in the America region at

- ▶ Tel.: +1 (717) 217-2270
- ▶ E-mail: inet-support.us@belden.com

in the Asia-Pacific region at

- ▶ Tel.: +65 6854 9860
- ▶ E-mail: inet-ap@belden.com

■ Hirschmann Competence Center

The Hirschmann Competence Center is ahead of its competitors:

- ▶ Consulting incorporates comprehensive technical advice, from system evaluation through network planning to project planning.
- ▶ Training offers you an introduction to the basics, product briefing and user training with certification.

The current technology and product training courses can be found at
<http://www.hicomcenter.com>

- ▶ Support ranges from the first installation through the standby service to maintenance concepts.

With the Hirschmann Competence Center, you have decided against making any compromises. Our client-customized package leaves you free to choose the service components you want to use.

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<http://www.hicomcenter.com>



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